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US 44045511 A

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(54) Coupling device

(57) A coupling device (2) enables two or more displays (4) to be coupled to a common keyboard (6). The coupling device (2) thus improves the efficiency and reduces space of a terminal system by reducing the number of keyboards required.

The coupling device (2) includes a sensing circuit (28) for sensing which displays are on and a switching or scrolling circuit (30) for toggling between active displays (4).

A terminal system is also disclosed and comprises the coupling device (2) with a number of displays (4) a keyboard (6) and a scrolling switch (22) for enabling the coupling device (2) to scroll between displays (4).
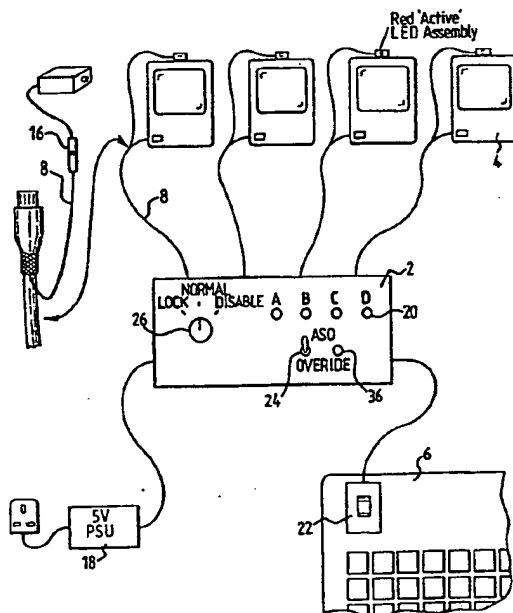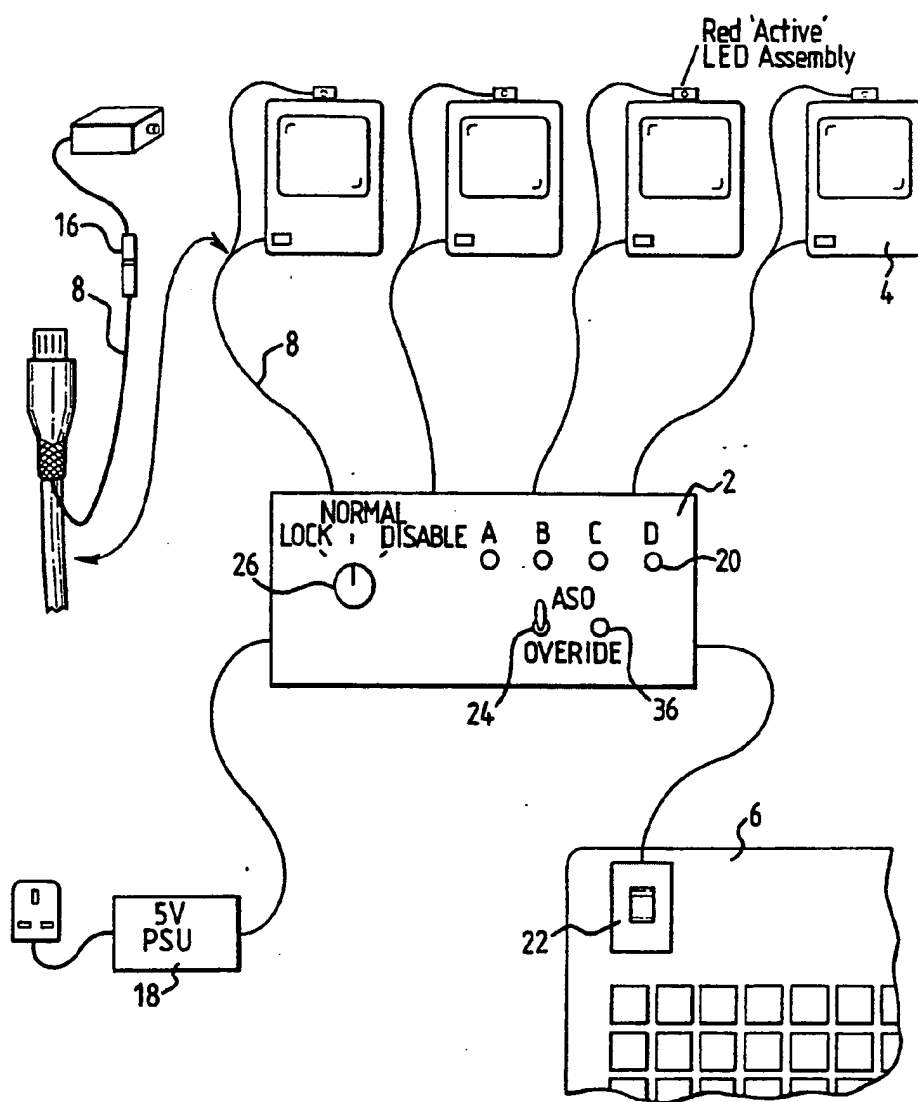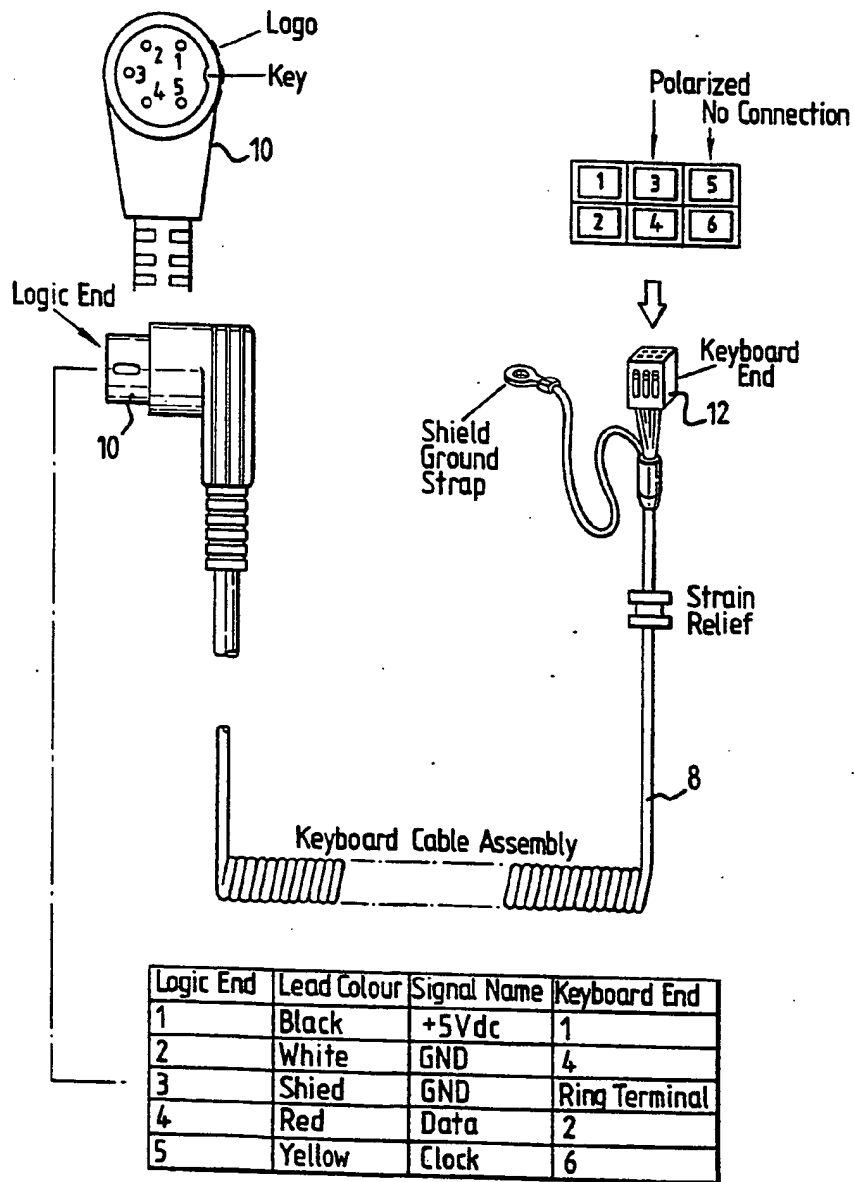
FIG.1

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ROSE 07519

Red 'Active'
LED Assembly

16

8

8

8

2

NORMAL
LOCK   DISABLE   A   B   C   D
○   ○   ○   ○   20

26

ASO
OVERIDE

24   36

4

6

22

5V
PSU

18

F I G.1

Logo

Key

10

Logic End

10

Polarized

No Connection

| 1 | 3 | 5 |
| 2 | 4 | 6 |

Keyboard
End

12

Shield
Ground
Strap

Strain
Relief

8

Keyboard Cable Assembly

Logic End	Lead Colour	Signal Name	Keyboard End
1	Black	+5Vdc	1
2	White	GND	4
3	Shied	GND	Ring Terminal
4	Red	Data	2
5	Yellow	Clock	6

FIG.2

F I G . 3

ROSE 07522

4/5

F I G.4

ROSE 07523

FIG.5

ROSE 07524
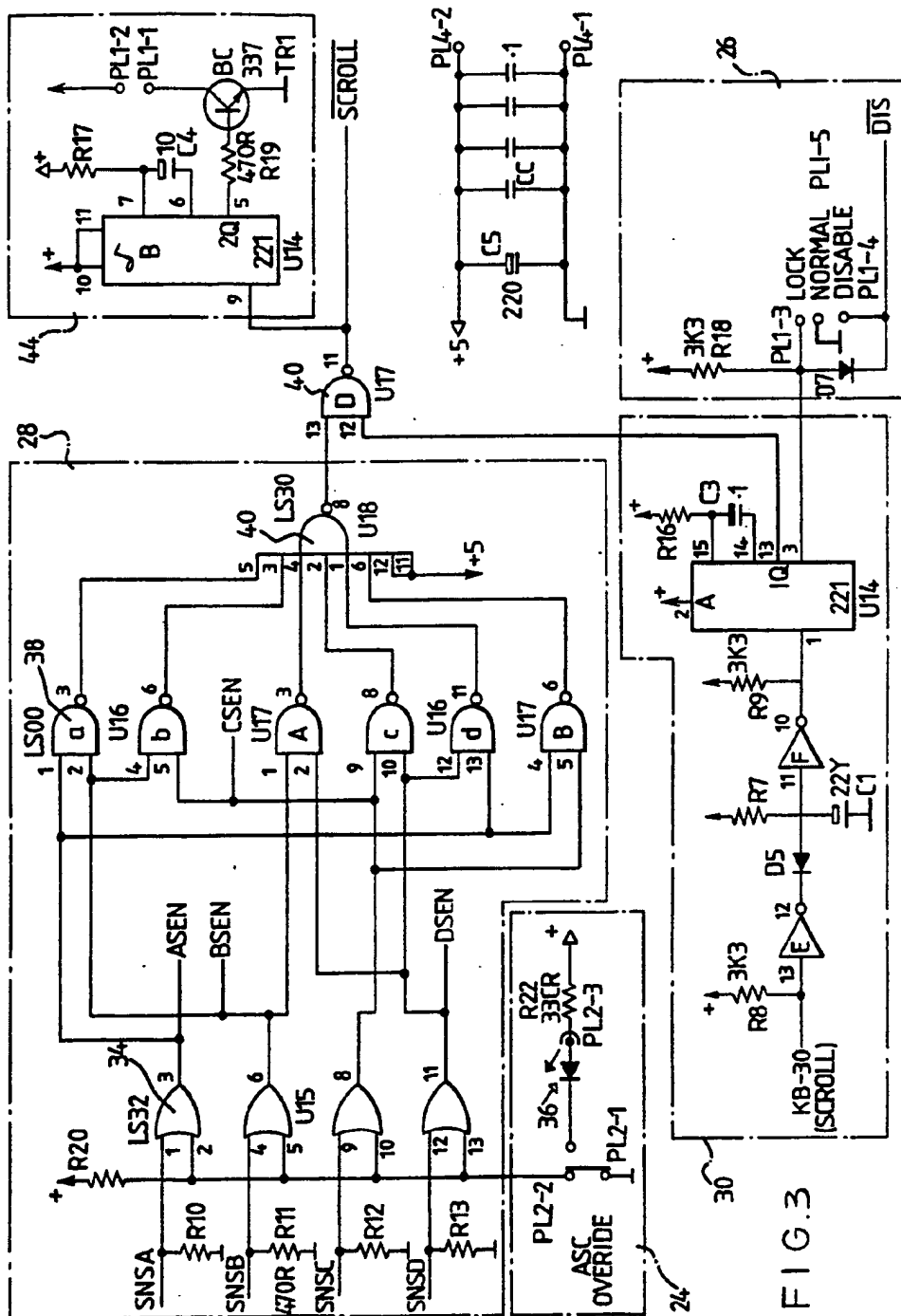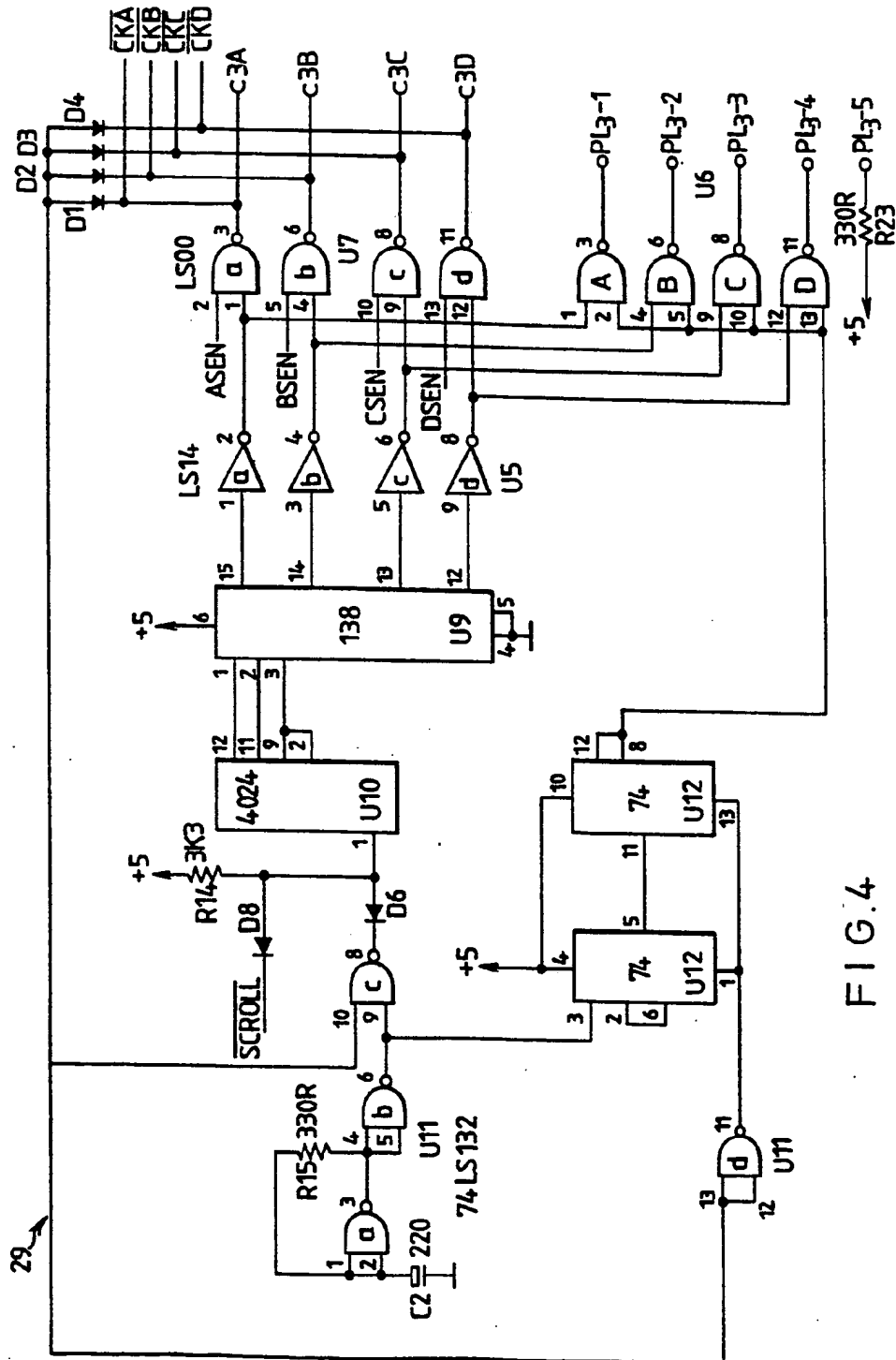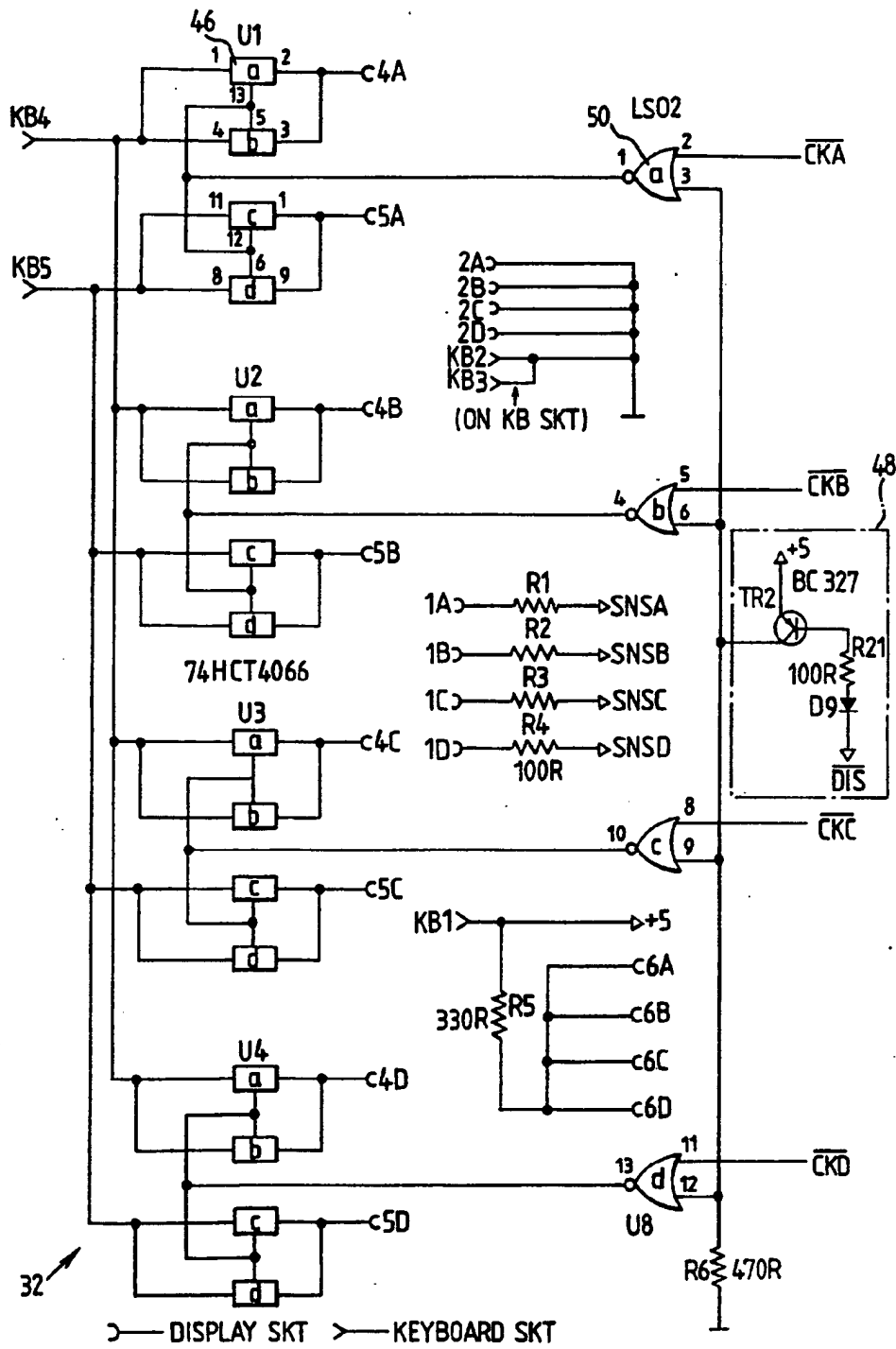
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COUPLING DEVICE

The present invention relates to a coupling device
for coupling one or more display screens to a common
keyboard and a terminal system incorporating such a
coupling device.

In most computer installations at present, each
display screen is coupled to a respective keyboard.
Although, the displays are constantly monitored, actual
input via the keyboard is in general very infrequent.
For those systems with more than one display, all the
keyboards occupy a large amount of space. In addition,
if such installations are unorganised, then there is the
possibility of a user trying to operate the wrong
keyboard to change a particular display.

One way of overcoming this problem would be to have
a keyboard which can be switched, using a simple switch,
between several display screens. However, such a simple
switch is only acceptable for some types of keyboards.
This is because for some types of keyboard the display
screen derives data from or interrogates the keyboard
and not just the keyboard sending data to the screen.
Consequently, any switch needs to be "intelligent" in
order to process such demands for data from the
displays.

An aim of the present invention is to provide a
coupling device for coupling between one or more
displays and a

keyboard and a terminal system, which overcomes these
problems.

According to the present invention there is provided
a coupling device for coupling a plurality of displays
to a common keyboard, comprising;

a sensing circuit for sensing which displays are
activated; and

a switching circuit for toggling between active
displays.

The coupling device of the present invention thus
enables one or more displays to be controlled from one
common keyboard. The present invention is thus more
efficient both in terms of cost and space and eliminates
the possibility of using the wrong keyboard to change a
particular display. The coupling device is also
"intelligent" and is able to process demands for data
from the displays.

The present invention also provides a terminal
system comprising;

a keyboard;

a scroll switch coupled to said keyboard;

a plurality of displays; and

a coupling device which comprises a sensing circuit
for sensing which displays are activated and a switching
circuit for toggling between active displays, thereby
enabling the or each display to be coupled to the
keyboard and enabling the coupling device to scroll

between active displays using said scroll switch.

By way of example only, a preferred embodiment of the present invention will now be described with reference to the accompanying drawings, of which:

figure 1 is a schematic of a terminal system according to the preferred embodiment;

figure 2 is a schematic view of a cable for coupling a display to a coupling device according to the preferred embodiment;

figure 3 is a schematic circuit diagram of part of the preferred coupling device;

figure 4 is a schematic diagram of a scanning circuit of the coupling device; and

figure 5 is a schematic circuit diagram of a switching circuit.

With reference first to figure 1, a coupling device 2 is shown coupling four displays 4 to a common keyboard 6. Any number of displays 4, within practical limits, may be used, but the preferred embodiment uses four displays 4.

In the preferred embodiment, each of the displays are of a compatible type. If, the coupling device 2 is to be used with other types of displays it may be adapted by changing the connectors on the device.

The displays 4 are coupled to the coupling device via repective cables 8. An enlarged and more detailed sketch of a cable 8 can be found in the top left hand

part of figure 1 and an even more detailed view can be found in figure 2. A logic end 10 of cable 8 is coupled to the display. The pin end 12 of cable 8 is coupled to the coupling device 2.

An LED 14 is coupled to a jack socket 16 at the logic end 10 of each cable 8. The LED 14, when lit indicates that the associated display 4 is active or powered up and can be operated using the common keyboard 6.

The coupling device 2 is coupled to a supply unit 18. The supply unit 18 also powers the keyboard 6 via the coupling device 2, in contrast to the conventional arrangement in which the keyboard is powered by the display.

The fact that the keyboard normally derives power from the display is used to provide a "sense" line to the coupling device. By sensing whether a display is powered up or activated, the coupling device can tell if a cable 8 is connected and coupled to an active display. This feature allows the coupling device to ignore any display that is inactive or not powered up. A number of LEDs 20 are provided on the coupling device 2 to indicate which of the displays 4 are activated.

The coupling device 2 scans between the "sense lines" to determine which of the displays 4 are activated. If two or more displays are activated, then a "scroll" switch 22 provided on the keyboard 6 may be

used to toggle between the displays.

An overide key 24 on the coupling device 2 enables further displays to be coupled to the coupling device 2 after the coupling device is already powered up.

A key switch 26 is also provided on the coupling device 2 and has three positions. The key switch 26 in the "normal" position has no effect. The key swtich 26 in the "lock" position enables the keyboard to lock to a particular active display and scrolling is stopped even though the scroll switch 22 is activated. If the key switch 26 is in the "disabled" position, then no data is sent from the keyboard to the displays and scrolling is also stopped.

The coupling device 2 enables data to be sent from the keyboard to the displays and vice versa. The coupling device 2 also enables data lines to be switched between the keyboard and display.

In order to provide the aforementioned functions, the coupling device 2 comprises a sensing circuit 28 to determine which displays are activated, a scanning circuit 29, a scrolling circuit 30, and a data line switching circuit 32. Figures 3, 4 and 5 are schematic diagrams of the circuits of the preferred embodiment.

With reference to figure 3, sensing circuit 28 includes four OR gates 34 each having an input from a respective display 4. The other input of the OR gates 34 are each coupled together and to the override key

24. If the override key is off, then inputs 2, 5, 10,
13 of the OR gates 34 are pulled low. If the override
key 24 is on, then the inputs 2, 5, 10, 13 of the OR
gates 34 are pulled high and the coupling device 2 will
automatically scan along the "sense lines" of each of
the displays. Furthermore, an LED 36 will light
indicating that the override switch 24 is on.

With the override 24 off, and none of the displays
activated or powered up, then the outputs 3, 6, 8, 11 of
the OR gates 34 are pulled low. Furthermore, signals
ASEN, BSEN, CSEN and DSEN are also low. These signals
are used in the scanning circuit 29 shown in figure 4.
A simple low speed clock provides a signal that is used
to scan round these four "sense" lines ASEN, BSEN, CSEN
and DSEN. The scanning circuit 29 enables the coupling
device to poll around the display ports in a loop until
the sensing circuit 28 detects whether a display is
activated or powered up.

Consider when display A is powered up. Input 1 of
the first OR gate 34 of the sensing circuit 28 is pulled
high. The output 3 of OR gate 34 is thus pulled high.
The outputs of the NAND gates 38 however do not change
from being high and thus NAND gate 40 remains low.
Irrespective of the signal provided by the scrolling
circuit 30, NAND gate 42 maintains a high output. The
scroll signal is consequently high and no change occurs
in circuit 44 which provides a short beep to indicate

when the scroll function is operational.

When two or more of the displays are activated, at least one of the outputs from NAND gates 38 are pulled low. This pulls the output of NAND gate 40 high. If the scroll circuit 30 is not activated using circuit switch 22, then NAND gate 42 will continue to have a high output. On the other hand, if the scroll switch 22 is activated then scrolling circuit 30 will produce a high output and the output of NAND gate 42 will be pulled low.

The change in output from NAND gate 42 from high to low will activate circuit 44 so that a short beep is produced.

If key switch 26 is in the normal position, then it has no influence on the scrolling circuit 30. On the other hand, if the key switch 26 is in the lock position, then scrolling circuit 30 must always provide a low output. This means that the scroll signal i.e. the output of NAND gate 42, always maintains a high level.

The coupling device 2 also includes data line switching circuit 32 shown in figure 5. Figure 5 illustrates only two data lines for each channel of each display 4. Naturally, three or more data lines maybe added, within practical limits, by the addition of extra switching chips.

The data lines switching circuit 32 comprises a

number of CMOS switches 46. The same signal from the
low speed clock is used to provide a switching pulse.

If the key switch 26 is in the disable position,
then disable circuit 48 produces a high output. One
input of the OR gates 50 are thus pulled high pulling
the output of each of the OR gates also high. Data line
switching is thus inhibited.

The aforegoing description has been given by way of
example only and a person skilled in the art will
appreciate that modifications may be made without
departing from the scope of protection as claimed in the
appended claims.

CLAIMS

1. A coupling device for coupling one or more displays to a common keyboard, comprising:

a sensing circuit for sensing which displays are activated; and

a switching circuit for toggling between active displays.

2. A terminal system comprising:

a keyboard;

a scroll switch coupled to said keyboard one or more displays; and

a coupling device as claimed in claim 1 for coupling the or each display to the keyboard and for scrolling between active displays using said scroll switch.

3. A coupling device substantially as described herein with reference to the accompanying drawings.

4. A terminal system substantially as described herein with reference to the accompanying drawings.

Patents Act 1977 **Examiner's report to the Comptroller under** Section 17 (The Search Report)	Application number 9122302.4

Relevant Technical fields	Search Examiner
(i) UK Cl (Edition K) G4A (AKS,AFGT), H4T (TBAX,TDDA) (ii) Int Cl (Edition 5) G06F 3/023	S J PROBERT

Databases (see over) (i) UK Patent Office (ii)	Date of Search 16.02.1992

Documents considered relevant following a search in respect of claims   1-4

Category (see over)	Identity of document and relevant passages	Relevant to claim(s)
X	US 4404551 "HOWSE ET AL" - whole document	1,2

1ms - c:\wp51\doc99\fil000198

Category	Identity of document and relevant passages	Relevant to claim(s)
		/

Categories of documents

X: Document indicating lack of novelty or of inventive step.

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